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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,733	02/02/2006	Akira Maenishi	L7002.06101	9734

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EXAMINER	
AKRAM, IMRAN	
ART UNIT	PAPER NUMBER
1723	

MAIL DATE	DELIVERY MODE
09/22/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,733	MAENISHI ET AL.	
	Examiner	Art Unit	
	IMRAN AKRAM	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-4 and 6-30* is/are pending in the application.

5a) Of the above claim(s) *9-15 and 18-29* is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-4,6-8,16,17 and 30* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/GB/08) Paper No(s)/Mail Date *8/11/11*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 8/11/11 have been fully considered but they are not persuasive. The Komiya reference still applies, albeit in modified form as necessitated by amendment.

2. The entirety of Applicant's arguments is directed towards the new claim language that Komiya does not include. However, as shown in the rejection below, the Examiner has cited details of Komiya as to why it includes "a second tubular wall (62) located outside of and coaxially with a first tubular wall (61) and a third tubular wall (14) inward of and coaxial to the first tubular wall, such that combustion gas can flow in a tubular space between the first and third walls." Komiya also includes width equalizing means, though in the form of an obviousness-type rejection. See below for further elaboration.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-4, 6-8, 16, 17, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komiya (US 2002/0042035 A1).

7. Regarding claim 1, Komiya discloses a reformer **2** that has a cylindrical or tubular shape (paragraph 11) with a first wall element **61** and a second wall element **62** disposed coaxially outside the first wall element (see figure 1); a tubular space **51** exists between the two wall elements and is provided with a evaporator portion **51a** and a reforming catalyst body **8** in axial relation with one another (see figure 1); a water inlet at the second wall element **62** (see gap at the top right portion of wall **62**); a feed gas inlet **26** at the second wall element **62** (see gap at top left portion of wall **62**); a burner **18** capable of combusting gas (paragraph 61); and a third tubular wall **14** disposed inwards and coaxially with first tubular wall **61**, the combustion gas being caused to flow

through combustion space **80** (paragraph 61) formed between the first **61** and third **14** wall elements (see figure 1). The reformer generates hydrogen with steam and feed gas (paragraph 4). The reformer causes the feed gas and steam to flow from the water evaporator to the reforming catalyst (paragraph 12). While the evaporator portion **51a** is not called an evaporator but a pre-heat layer instead, water is transmitted to the pre-heat layer **51a** via the heating channel **48** and is converted to steam in the process (paragraph 88). Where and when evaporation of the water occurs is process condition–dependent. The water and feed gas inlets are configured to inject the water and feed gas at separate locations of the evaporator along the rim of its top since the device is cylindrical (paragraph 64).

8. Komiya discloses rods **81** outside second wall element **62** that make the gas flow path more tortuous, increase heat transfers uniformity (paragraph 91), and are capable of equalizing width of the passageways, but does not disclose the use of these rods in space **80**. It would have been obvious to one having ordinary skill in the art at the time of invention to add the rods **81** to the space **81** of Komiya to add their advantages to an additional flow path.

9. Regarding claim 2, Komiya discloses that the reformed gas is caused to flow from an axial end of said reforming catalyst body (paragraph 70).

10. Regarding claim 3, Komiya discloses that said water evaporator is disposed under said reforming catalyst body (see figure 1) as this is simply a matter of orientation. The reforming would be fully capable of operating upside-down from that depicted in figure 1 and the apparatus components and positioning would be the same.

11. Regarding claim 4, Komiya discloses that said first and second tubular wall elements are each constructed of a cylindrical seamless pipe (see figure 1).

12. Regarding claim 6, Komiya discloses that said burner is oriented to cause a flame to be emitted upward from said burner (see figure 1). Again, this is a matter of orientation, and the apparatus can be turned around.

13. Regarding claim 7, Komiya discloses a reformer **2** that has a cylindrical or tubular shape (paragraph 11) with a first wall element **61** and a second wall element **62** disposed coaxially outside the first wall element (see figure 1); a tubular space **51** exists between the two wall elements and is provided with a evaporator portion **51a** and a reforming catalyst body **8** in axial relation with one another (see figure 1); a water inlet at the second wall element **62** (see gap at the top right portion of wall **62**); a feed gas inlet **26** at the second wall element **62** (see gap at top left portion of wall **62**); a burner **18** capable of combusting gas (paragraph 61); and a third tubular wall **14** disposed inwards and coaxially with first tubular wall **61**, the combustion gas being caused to flow through combustion space **80** (paragraph 61) formed between the first **61** and third **14** wall elements (see figure 1). The reformer generates hydrogen with steam and feed gas (paragraph 4). The reformer causes the feed gas and steam to flow from the water evaporator to the reforming catalyst (paragraph 12). While the evaporator portion **51a** is not called an evaporator but a pre-heat layer instead, water is transmitted to the pre-heat layer **51a** via the heating channel **48** and is converted to steam in the process (paragraph 88). Where and when evaporation of the water occurs is process condition–dependent. The water and feed gas inlets are configured to inject the water and feed

gas at separate locations of the evaporator along the rim of its top since the device is cylindrical (paragraph 64).

14. Komiya discloses that said burner is disposed in an internal space of said third tubular wall element **14** (see figure 1), said hydrogen generator further comprising: a first lid element **71** disposed with a gap between said first lid element and an upper end of said third tubular wall element **14** so as to close an upper end of said first tubular wall element **61**, wherein the combustion gas generated in said burner is caused to flow from an interior of said third tubular wall element into the combustion gas passage **80** through the gap (see figure 1).

15. Komiya discloses rods **81** outside second wall element **62** that make the gas flow path more tortuous, increase heat transfers uniformity (paragraph 91), and are capable of equalizing width of the passageways, but does not disclose the use of these rods in space **80**. It would have been obvious to one having ordinary skill in the art at the time of invention to add the rods **81** to the space **81** of Komiya to add their advantages to an additional flow path.

16. Regarding claim 8, omiya discloses a reformer **2** that has a cylindrical or tubular shape (paragraph 11) with a first wall element **61** and a second wall element **62** disposed coaxially outside the first wall element (see figure 1); a tubular space **51** exists between the two wall elements and is provided with a evaporator portion **51a** and a reforming catalyst body **8** in axial relation with one another (see figure 1); a water inlet at the second wall element **62** (see gap at the top right portion of wall **62**); a feed gas inlet **26** at the second wall element **62** (see gap at top left portion of wall **62**); a burner

18 capable of combusting gas (paragraph 61); and a third tubular wall **14** disposed inwards and coaxially with first tubular wall **61**, the combustion gas being caused to flow through combustion space **80** (paragraph 61) formed between the first **61** and third **14** wall elements (see figure 1). The reformer generates hydrogen with steam and feed gas (paragraph 4). The reformer causes the feed gas and steam to flow from the water evaporator to the reforming catalyst (paragraph 12). While the evaporator portion **51a** is not called an evaporator but a pre-heat layer instead, water is transmitted to the pre-heat layer **51a** via the heating channel **48** and is converted to steam in the process (paragraph 88). Where and when evaporation of the water occurs is process condition–dependent. The water and feed gas inlets are configured to inject the water and feed gas at separate locations of the evaporator along the rim of its top since the device is cylindrical (paragraph 64).

17. Komiya discloses that the combustion gas flows along the first wall element via passage **80** on its way to a break formed in the first wall element **61** to combustion outlet **24**. Whether this direction is considered "downwards" is, too, a matter of orientation.

18. Komiya discloses rods **81** outside second wall element **62** that make the gas flow path more tortuous, increase heat transfers uniformity (paragraph 91), and are capable of equalizing width of the passageways, but does not disclose the use of these rods in space **80**. It would have been obvious to one having ordinary skill in the art at the time of invention to add the rods **81** to the space **81** of Komiya to add their advantages to an additional flow path.

19. Regarding claim 16, Komiya discloses a tubular cover **63** that is configured to cover said second tubular wall element **62** and forms a double-walled pipe along with said second tubular wall element **63** (see figure 1), wherein the reformed gas flowing out from said reforming catalyst body (paragraph 70) is caused to flow a tubular space **50** between said second tubular wall element **62** and said tubular cover **63** (paragraph 70).

20. Regarding claim 17, Komiya discloses a reformer **2** that has a cylindrical or tubular shape (paragraph 11) with a first wall element **61** and a second wall element **62** disposed coaxially outside the first wall element (see figure 1); a tubular space **51** exists between the two wall elements and is provided with a evaporator portion **51a** and a reforming catalyst body **8** in axial relation with one another (see figure 1); a water inlet at the second wall element **62** (see gap at the top right portion of wall **62**); a feed gas inlet **26** at the second wall element **62** (see gap at top left portion of wall **62**); a burner **18** capable of combusting gas (paragraph 61); and a third tubular wall **14** disposed inwards and coaxially with first tubular wall **61**, the combustion gas being caused to flow through combustion space **80** (paragraph 61) formed between the first **61** and third **14** wall elements (see figure 1). The reformer generates hydrogen with steam and feed gas (paragraph 4). The reformer causes the feed gas and steam to flow from the water evaporator to the reforming catalyst (paragraph 12). While the evaporator portion **51a** is not called an evaporator but a pre-heat layer instead, water is transmitted to the pre-heat layer **51a** via the heating channel **48** and is converted to steam in the process (paragraph 88). Where and when evaporation of the water occurs is process condition–

dependent. The water and feed gas inlets are configured to inject the water and feed gas at separate locations of the evaporator along the rim of its top since the device is cylindrical (paragraph 64).

21. Komiya discloses a tubular cover **63** that is configured to cover said second tubular wall element **62** and forms a double-walled pipe along with said second tubular wall element **63** (see figure 1), wherein the reformed gas flowing out from said reforming catalyst body (paragraph 70) is caused to flow a tubular space **50** between said second tubular wall element **62** and said tubular cover **63** (paragraph 70).

22. Komiya discloses a rod element **81** disposed at a position of the reformed gas passage to extend in a circumferential direction of said second tubular wall element **62** (paragraph 72), and the rod element is sandwiched between said second tubular wall element **62** and said tubular cover **63** (see figure 1). The rod is considered flexible as it is wound around the tubular element.

23. Komiya discloses rods **81** outside second wall element **62** that make the gas flow path more tortuous, increase heat transfers uniformity (paragraph 91), and are capable of equalizing width of the passageways, but does not disclose the use of these rods in space **80**. It would have been obvious to one having ordinary skill in the art at the time of invention to add the rods **81** to the space **81** of Komiya to add their advantages to an additional flow path.

24. Regarding claim 30, Komiya discloses a combustion gas exhaust pipe **71** connected to the first wall **61** capable of guiding the combustion gas radially and downward of said first wall **61** (see figure 1).

Conclusion

25. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IMRAN AKRAM whose telephone number is (571)270-3241. The examiner can normally be reached on 10-7 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/I. A./
Examiner, Art Unit 1723

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1723